



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,200	07/11/2006	Akeyuki Komatsu	2006_0654A	8497
52349 7590 03/03/2008 WENDEROTH, LIND & PONACK L.L.P. 2033 K. STREET, NW SUITE 800 WASHINGTON, DC 20006				
EXAMINER LE, TUNG X				
ART UNIT 2821		PAPER NUMBER		
MAIL DATE 03/03/2008		DELIVERY MODE PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/578,200

Applicant(s)

KOMATSU ET AL.

Examiner

TUNG X. LE

Art Unit

2821

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-17 and 19 is/are rejected.
- 7) ☒ Claim(s) 4, 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date 8/3/2006
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the Applicants' communication filed on July 11, 2006. In virtue of this filing, claims 1-19 are currently presented in the instant application.

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 05/10/2004. It is noted, however, that applicant has not filed a certified copy of the 2004-139406 application as required by 35 U.S.C. 119(b).

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 08/03/2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

3. The drawings submitted on 05/04/2006 are accepted.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 6-9, and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shin (U.S. Patent No. 6,661,181 B2).

With respect to claim 1, Shin discloses in figures 13-14 a cold-cathode tube lighting device comprising a plurality of ballasts [C8-C11], at least one of said ballasts being connected to an electrode at one end (having an electrode of each lamp connected to the capacitors [C8-C11]) of each of a plurality of cold-cathode tubes [231a-231d]; a first low-impedance power source [T8, T10, the combined impedance of lamps [231-231d] having an output impedance [T8, T10] and a combined impedance (having a combined impedance of the combined impedance of the lamps [231a- 231d]) of said cold-cathode tubes, said first low-impedance power source being connected to the electrode at one end of each of said cold-cathode tubes via said ballasts (see figure 13); a second low-impedance power source [T9, T11, the combined impedance of lamps [231-231d] having an output impedance [T9, T11] and the combined impedance of said cold-cathode tubes [231a- 231d], said second low-impedance power source being connected to an electrode at the other end of each of said cold-cathode tubes (see figure 13); and a phase correction circuit [CT4, 233] for adjusting a phase difference (figure 14 shows a difference phase between the ballasts of the lamps) between an output (the output of the transformers [T8, T10]) from said first low-impedance power source and an output (the output of the transformers [T9, T11]) from said second low-impedance power source, so that electrode potentials at both ends of each of said cold-cathode tubes change in opposite phase with respect to each other (see figure 14), **except for specifying** that the output impedance is lower than the combined impedance. However, this difference is not of patentable merits since it has been theoretically known that the impedances of the circuit are related to the output

current and the output voltage for driving the lamps. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the output impedance lower than the combined impedance in order to get a desired output current for the lamp brightness.

With respect to claim 6, Shin discloses in figure 13 that wherein each of said first low-impedance power source and said second low-impedance power source comprises a transformer [T8-T11] connected to said ballast capacitors [C8-C11], ***except for specifying*** that an output impedance is lower than the combined impedance. However, this difference is not of patentable merits since it has been theoretically known that the impedances of the circuit are related to the output current and the output voltage for driving the lamps. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the output impedance lower than the combined impedance in order to get a desired output current for the lamp brightness.

With respect to claim 7, Shin discloses in figure 13 that wherein said transformer [T8] comprises a core (the transformer having a core for winding the coils around the core), a primary winding (having a primary winding connected to the controller [CT4]) being wound around said core, and a secondary winding (having a secondary winding connected to the capacitor [C8]) being wound around at least one of the inside and outside of said primary winding (figure 13).

With respect to claim 8, Shin discloses that wherein said secondary winding has one configuration of a sectional winding (figure 13).

With respect to claim 9, Shin discloses in figure 9 that wherein each of said first low-impedance power source and said second low-impedance power source comprises a power transistor [Q1-Q2] connected to said ballast capacitors [C1-C2].

With respect to claim 13, Shin discloses in figure 13 that wherein each of said ballasts comprises a capacitor [C8-C11].

With respect to claim 14, Shin discloses in figure 13 that wherein said capacitor has an inter-layer capacity of a substrate (the capacitor [C8] having an inter-layer of a substrate disposed in side itself).

With respect to claim 15, Shin discloses that the device further comprises matching capacitors [C8-C11], at least one of said matching capacitors being connected across a ground (having a ground potential disposed in side of the circuit [233]) potential and the electrode at one end of each cold-cathode tube connected to said ballast (figure 13).

With respect to claim 16, Shin discloses in figure 13 that wherein each of said matching capacitor has an inter-layer capacity of a substrate (the capacitor [C8] having an inter-layer of a substrate disposed in side itself).

With respect to claim 17, Shin discloses all of claimed limitations, as expressly recited in claims 1 and 15, except for specifying that an impedance of said ballast and an impedance of said matching capacitor are matched with each other. However, this difference is not of patentable merits since the lamp current is set and dependent on a particular application and environment of use. Therefore, to select an appropriate value of the current flowing through the lamps of Shin with an impedance of the matching

capacitor are matched with each other as claimed for an effective operation for getting a desired brightness would have been deemed obvious to a person skilled in the art.

With respect to claim 19, Shin discloses in figures 6 and 13-14 liquid crystal display comprising a plurality of cold-cathode tubes [223, 225]; a liquid crystal panel [212] installed on the front side of said cold-cathode tubes (figure 6), said liquid crystal panel shielding light emitted from said cold-cathode tubes using a predetermined pattern (having a light guide plate [224] comprising a predetermined pattern for lighting); and a cold-cathode tube lighting device (figure 13), wherein said cold-cathode tube lighting device comprises a plurality of ballasts [C8-C11], at least one of said ballasts being connected to an electrode at one end (having an electrode of each lamp connected to the capacitors [C8-C11]) of each of a plurality of cold-cathode tubes [231a-231d]; a first low-impedance power source [T8, T10, the combined impedance of lamps [231-231d] having an output impedance [T8, T10] and a combined impedance (having a combined impedance of the combined impedance of the lamps [231a- 231d]) of said cold-cathode tubes, said first low-impedance power source being connected to the electrode at one end of each of said cold-cathode tubes via said ballasts (see figure 13); a second low-impedance power source [T9, T11, the combined impedance of lamps [231-231d] having an output impedance [T9, T11] and the combined impedance of said cold-cathode tubes [231a- 231d], said second low-impedance power source being connected to an electrode at the other end of each of said cold-cathode tubes (see figure 13); and a phase correction circuit [CT4, 233] for adjusting a phase difference (figure 14 shows a difference phase between the ballasts of the lamps)

between an output (the output of the transformers [T8, T10]) from said first low-impedance power source and an output (the output of the transformers [T9, T11]) from said second low-impedance power source, so that electrode potentials at both ends of each of said cold-cathode tubes change in opposite phase with respect to each other (see figure 14), **except for specifying** that the output impedance is lower than the combined impedance. However, this difference is not of patentable merits since it has been theoretically known that the impedances of the circuit are related to the output current and the output voltage for driving the lamps. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the output impedance lower than the combined impedance in order to get a desired output current for the lamp brightness.

6. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shin (U.S. Patent No. 6,661,181 B2) in view of Takeda et al. (U.S. 2005/0285478 A1).

With respect to claim 2, Shin discloses in figures 6 and 13 that said first low-impedance power source, said second low-impedance power source, and said phase correction circuit are mounted on a first substrate [212], **except for specifying** that the ballasts [C8-C11] are mounted on a second substrate.

Takeda discloses in figure 9 a cold cathode tube lighting device having an impedance power source [1] and a controller [10, 11] mounted on a first substrate [32] and a ballast [20] mounted on a second substrate [33].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the lighting device of Shin by arranging the impedance

power sources and the correction circuit different substrate with the ballast circuit in order to improve or reduce the noise signal since an arrangement of substrates of the circuit therein for the stated purpose has been well known in the art as evidenced by the teaching of Takeda (figure 9, paragraph [0104]).

With respect to claim 3, the combination of Shin and Takeda disclose that wherein one end of each of said cold-cathode tubes is connected to the second substrate (see figure 9 of Takada).

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shin (U.S. Patent No. 6,661,181 B2) in view of Lin et al. (U.S. Publication No. 2004/0207339 A1).

With respect to claim 5, Shin discloses all of claimed subject matter, as recited in claim 1, except for specifying that the circuit further comprises a detector for detecting current following through the cold cathode tubes.

Lin discloses in figures 9-10 a cold cathode lighting device comprising a detector (having a detector connected to the secondary winding of the transformer and sensing a CCFL current control signal to the controller) for detecting current flowing through the cold cathode tubes [CCFL1-CCFL2].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the lighting device of Shin by employing a detector connected to the output of the lamps in order to detect the current flowing through the lamps since such a detector for the lamp current for the stated purpose has been well known in the art as evidenced by the teaching of Lin (figure 9).

8. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shin (U.S. Patent No. 6,661,181 B2) in view of Oh (U.S. Publication No. 2005/0156534 A1).

With respect to claim 10, Shin discloses all of claimed subject matter, as recited in claim 1, expect for specifying that each of the ballast of the lighting circuit device further comprises an inductor.

Oh discloses a lighting circuit device (figure 3) comprising a ballast [L1, C7] including an inductor [L1].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the lighting device of Shin by adding an inductor to the output of the transformer [T8] in order to limit and prevent a over current flowing through the lamps since such an additional inductor included in the ballast connected at the output of the transformer for the preventing an over current for the state purpose has been well known in the art as evidenced by the teaching of Oh (paragraph [0046]).

With respect to claim 11, Shin discloses that wherein said secondary winding has one configuration of a sectional winding (figure 13).

With respect to claim 12, the combination of Shin and Oh discloses all of claimed limitations, as expressly recited in claims 1 and 10-11, expect for specifying that the inductor is a saturable reactor. However, this difference is not of patentable merits since the lamp current is set and dependent on a particular application and environment of use. Therefore, to select an appropriate value of the current flowing through the lamps of the combination of Shin and Oh with a saturable reactor as claimed for an

effective operation for getting a desired brightness would have been deemed obvious to a person skilled in the art.

Allowable Subject Matter

9. Claims 4 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

Prior art of record fails to disclose or fairly suggest:

- The cold cathode tube lighting device comprising said phase correction circuit comprises a delay circuit for delaying one of a first pulse signal for instructing an output timing with respect to said first low-impedance power source a second pulse signal for instructing an output timing with respect to said second low-impedance power source, from the other signal by a constant quantity as claimed in dependent claim 4.
- The cold-cathode tube lighting device comprising wherein an impedance of said ballast, a combined impedance of said matching capacitor and a stray capacitance in the periphery of said cold-cathode tube, and an impedance of said cold-cathode tube during lighting are matched with each other as claimed in dependent claim 18.

Citation of Relevant Prior Art

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hirakata et al. (U.S. 2007/0052664 A1) discloses a liquid crystal display device having an improved lighting device.

Hur et al. (U.S. 2004/0232853 A1) discloses an external electrode fluorescent lamp, backlight unit using the EEFL, LCD backlight equipment using the backlight unit and driving device thereof.

Lee et al. (U.S. 6,979,957 B2) discloses an apparatus for driving lamp of LCD device.

Inquiry

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TUNG X. LE whose telephone number is (571)272-6010. The examiner can normally be reached on 8:30 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas Owens can be reached on 571-272-1662. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2821

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Douglas W Owens/
Supervisory Patent Examiner, Art Unit 2821
February 28, 2008